

# Work Order ID 56797

March 10, 2010 12:53:40 PM



Page 1

Item ID: D407-667-205

Accept



Setup Start

Revision ID:

Item Name: Crosstube Aft

Stop



Start Date: 10/03/2010 Start Qty: 1.00



Required Date: 25/03/2010 Req'd Qty: 1.00



Cust Item ID:

Customer:

Reference:

Approvals:

Process Plan:

*14*

Date: *10-3-10* Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D407-667-245

Rev F

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D407-667-205 CHG006

*Scolor 13*

*AJ for BG 10/05/13*

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

*(14) MB 10-05-05*

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio FT



*10-5-5*



W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130

QC15- Crosstube Dimensional Check

0.00

Subtotal



QC

Memo

0.00

40

Quality Control

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

140



Crosstubes

Crosstubes

Crosstubes

Memo

0.00

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill only the top (2) holes.

5-Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245

6-Drill Aft rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Note: Aft side has 3x top holes.

7-Drill Fwd rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Drill only the top (3) holes.

8-C'sink holes as per Dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

9- Scribe tube to identify on the inner chamfer in the cuff D# and B#

10-Deburr & Inspect for surface damage. Repair damage within limits as per

1 - 10-5-06

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
	Dwg D407-667-245								
150  HandFXtube Hand Finishing Crosstubes	Crosstubes Chemical Conversion  Memo	0.00  0.00							1 - - AWM 10-5-06
160  QC Quality Control	QC3- Inspect Part Finish  Memo	0.00  0.00							8/10/05/06
170  QC Quality Control	QC5- Inspect part completeness to step on W/O  Memo	0.00  0.00							8/10/05/06 

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Required Date: 25/03/2010 Req'd Qty: 1.00

Reference:

Cust Item ID:

Customer:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start  
Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 Outsource2 Outsource process - NDT	Outsource process - NDT per QSI038 4.1  Memo Liquid Penetrant Inspection as per QSI 0380 Issue P/O: <u>11844</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order	0.00  0.00							<u>CL</u> <u>10/5/6</u> <u>①</u>
190 Packaging Packaging	Packaging  Memo Ensure copy of NDT results attached to work order.	0.00  0.00							<u>PC</u> <u>10/5/6</u> <u>①</u>
200 QC Quality Control	QC5- Inspect part completeness to step on W/O  Memo	0.00  0.00							<u>ML</u> <u>10</u> <u>05</u> <u>07</u> <u>①</u>

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

210



SprayPaint

SprayPaint

0.00

Spray Painting

Memo

0.00

1-Prime inside and outside crosstube as per QSI 005 4.2  
2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 10:00

Finish Time: 11:00

PAINT:

Start Time: 02:50

Finish Time: 3:30

ml 10 05 10 (1)

220



QC

Quality Control

QC14- Inspect Spray Paint

0.00

Memo

0.00

Then, Wrap in plastic bag to protect from scratches

85 10-05-11

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Required Date: 25/03/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230	Crosstubes	0.00							
	Crosstubes								
Crosstubes	Memo	0.00							
	1-Install abrasion strips as per QSI 035 using DT8674. Install chafing shield as per Dwg D407-667-245. Note: (3) top holes should be facing up.								
	2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe								
	3-Install support with magnobond and install clamps as per Dwg D407-667-245 using installation jig DT9025. Torque clamps to 80-100 in lb								
	A/R Magnobond Batch: <u>114021</u>								
	EXP: <u>01/2011</u>								
	4-Install nut plates as per Dwg D407-667-245. Touch-up rivet heads with Imron paint. → ml 1010512								
240	QC5- Inspect part completeness to step on W/O	0.00							
	QC								
Quality Control	Memo	0.00							

MA 10 05 11 (7)

8 1010512

70

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Cust Item ID:

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

10-5-10

SL

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

8/6/5/13

(2)

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and in kanban rack  
Location: 33

RevE

10-5-13

SL

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Start Date: 10/03/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 25/03/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/05/17 *[Signature]*  
BS10-5-13  
①

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

March 10, 2010 12:53:47 PM

Page 1

Work Order ID: 56797

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Comments: IPP Rev:C 05.09.02 Add holes for compatibility with Bell Skidtubes KJ/JLM  
IPP Rev:D Added Magnobond, Rubber Cushion & Clamps 07-02-19  
JLM

Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

AN960JD516

Purchased

No

NAS11900S63J

100

Each

0.0000

18.0000

Washer

D2856-400

Manufactured

No

230

f

240.7221

1.3558

Abraison Strip

#  
13:56626

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST403

240.7220842

50593

138.592084

52563

102.13

D2873-043

Manufactured

No

230

Each

49.0000

2.0000

Nut Plate Assembly

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

49

45370

2

45422

1

50871

6

53966

20

56466

20

M113706 10-5-12

10.05.11

10-05-12

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Comments: IPP Rev:C 05.09.02 Add holes for compatibility with Bell Skidtubes KJ/JLM  
IPP Rev:D Added Magnobond, Rubber Cushion & Clamps 07-02-19  
JLM

Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

D2873-045



Nut Plate Assembly

Manufactured No

230

Each

47.0000

2.0000



Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

47

45210

3

50001

4

53967

20

53968

20

MA 10-05-12

D2894-1



2.750 Support

Manufactured No

230

Each

25.0000

1.0000



Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

25

43713

6

43881

18

45483

1

MA 10-05-11

March 10, 2010 12:53:47 PM

Shop Packet Print

Page 2

W/O:			WORK ORDER CHANGES					
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Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Comments: IPP Rev: C 05.09.02 Add holes for compatibility with Bell Skidtubes KJ/JLM  
IPP Rev: D Added Magnobond, Rubber Cushion & Clamps 07-02-19  
JLM

Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

D3190-1 Manufactured No 230 Each 22.0000 2.0000  
Chafing Shield

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST

22

40109

2

47456

20

D407-667-205TRN Manufactured No 230 Each 2.0000 1.0000  
Crosstube Turning Detail

Warehouse Loc Qty Loc Code

Location

Main Warehouse

LG

2

55833

1

55834

1

MS20601-AD4W8 Purchased No 230 Each 302.0000 14.0000  
RIVET

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST322

302

108521

200

112203

102

10.05.11

2-58113 MB 10-05-05

10.05.12

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Shop Packet Print

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IPP Rev: D Added Magnobond, Rubber Cushion & Clamps 07-02-19  
JLM

Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

MS21920-22



Clamp(per MIL-DTL-8783C)

Purchased

No

230

Each

146.0000

4.0000



## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

LG

146

109495

6

110260

2

111210

38

114077

100

*10.05.11*

AN5-10A



Bolt

Purchased

No

260

Each

80.0000

10.0000



*M114227 10-5-12*

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST337

80

107013

8

110363

2

112314

1

113149

1

113524

18

114056

50

March 10, 2010 12:53:48 PM

Shop Packet Print

Page 4

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:			WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP		Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
				Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

March 10, 2010 12:53:48 PM

Page 5

Work Order ID: 56797

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Comments: IPP Rev:C 05.09.02 Add holes for compatibility with Bell Skidtubes KJ/JLM  
IPP Rev:D Added Magnobond, Rubber Cushion & Clamps 07-02-19  
JLM

Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

AN5-32A



Bolt

Purchased

No

260

Each

236.0000

4.0000



10-5-12 SP

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST340

236

106242

3

106519

4

110363

17

112933

12

113121

100

114056

100

4

AN5-34A



Bolt

Purchased

No

260

Each

130.0000

4.0000



10-5-12 SP

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST340

130

104679

2

107013

2

113149

76

113226

50

4

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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				Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

March 10, 2010 12:53:48 PM

Page 6

Work Order ID: 56797

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Comments: IPP Rev:C 05.09.02 Add holes for compatibility with Bell Skidtubes KJ/JLM  
IPP Rev:D Added Magnobond, Rubber Cushion & Clamps 07-02-19  
JLM

Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

MS21042L5

Purchased

No

260

Each

531.0000

4.0000



Nut



10-5-100

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST300

531

110382

10

111636

1

112314

17

113523

107

113537

196

114108

200

MS21920-25

Purchased

No

260

Each

172.0000

2.0000



Clamp(per MIL-DTL-8783C)



4

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

LG

172

108111

3

108975

17

109181

42

109644

10

113281

25

113282

50

113744

25

10-05-11

March 10, 2010 12:53:48 PM

Shop Packet Print

Page 6

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

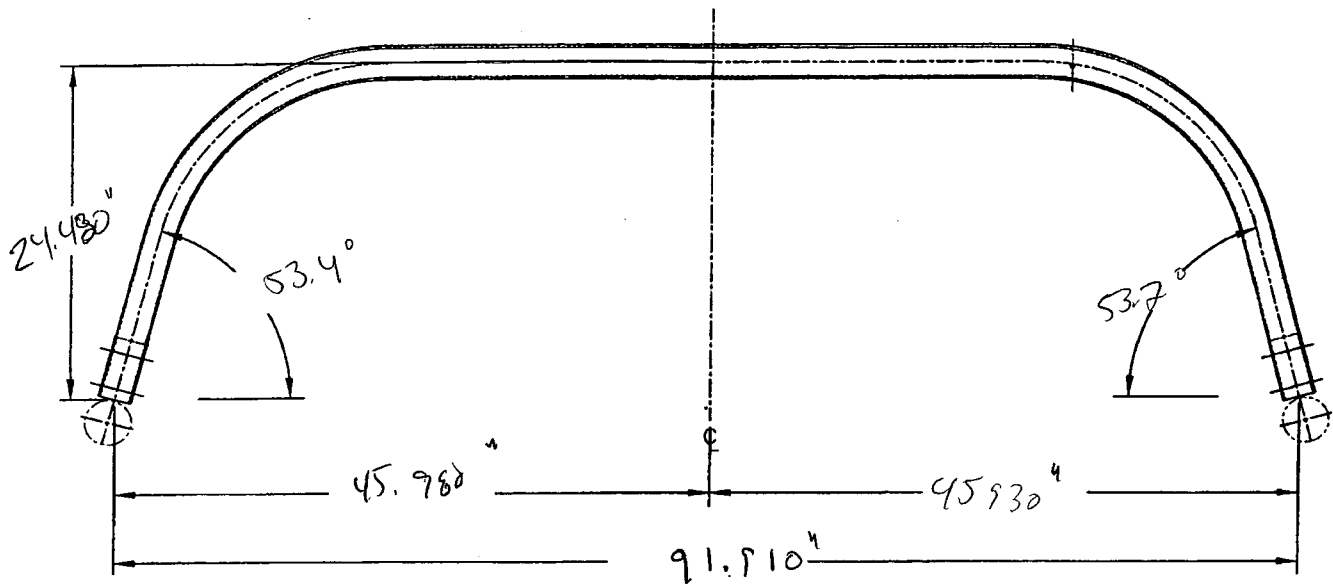
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:			WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP		Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
				Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b> 5679.1	
<b>Description:</b> Crosstube High Aft (407)	<b>Part Number:</b> D407-667-205	
<b>Inspection Dwg:</b> D407-667-245	<b>Rev:</b> F	<b>Page 1 of 1</b>

Required Dimension	Min	Max
Height	23.46	23.58
1/2 Span	45.86	45.98
Angle	54	56
Total Span	91.72	91.96



Comments
ANGLES BELOW TOL. ACCEPTABLE 9/10.05.05

QC15 Inspection	S. 10/05/05
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	





Item	QTY -245	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

#### GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6011-115  
FINISHED LENGTH = 112.91±0.020
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 27.7 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.  
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS. ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, PER QSI 035.
- INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE OPPOSITE D2894-1 SUPPORT.
- TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 56797  
P/J 10-3110

RELEASED  
08/11/06

F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1); RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C6-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PAR#08-21 AND ECN#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN	9	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	8	DRAWING NO.	REV. F
MFG. APPR.	8	D407-667-245	SHEET 1 OF 4
APPROVED	4	TITLE	SCALE
DE APPR.	4	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESSED CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

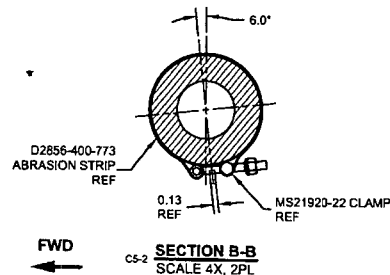
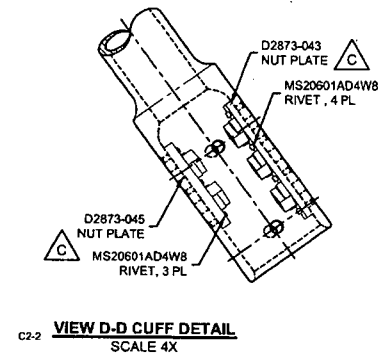
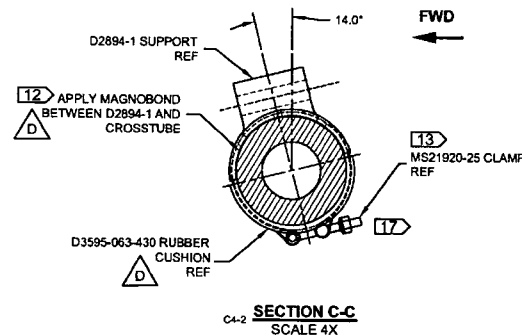
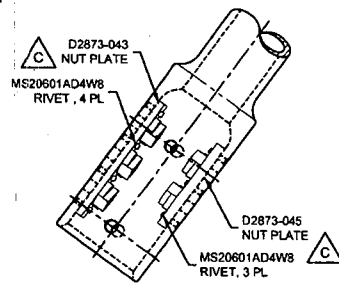
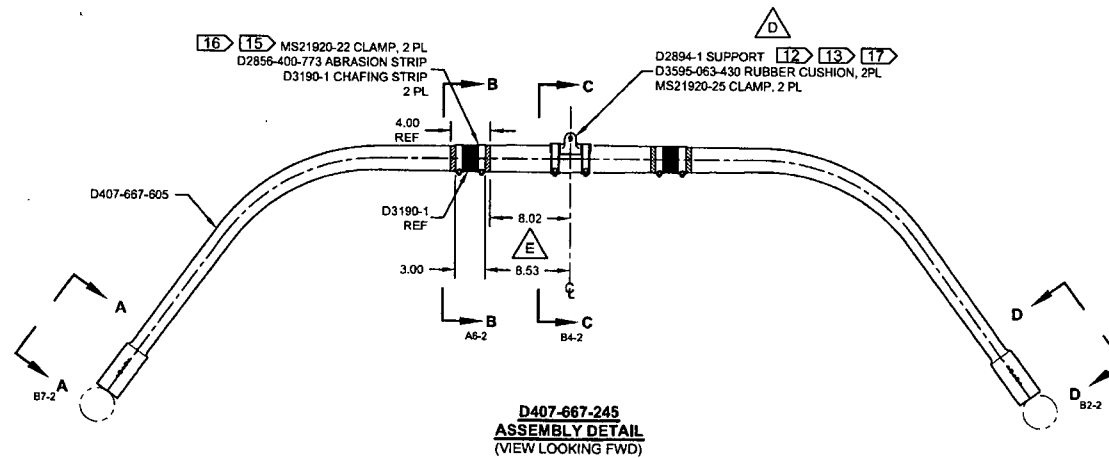
W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



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08/11/12

DESIGN	9	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. F
MFG. APPR.	9	D407-667-245	SHEET 2 OF 4
APPROVED	140	TITLE	SCALE
DE APPR.	14	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD	
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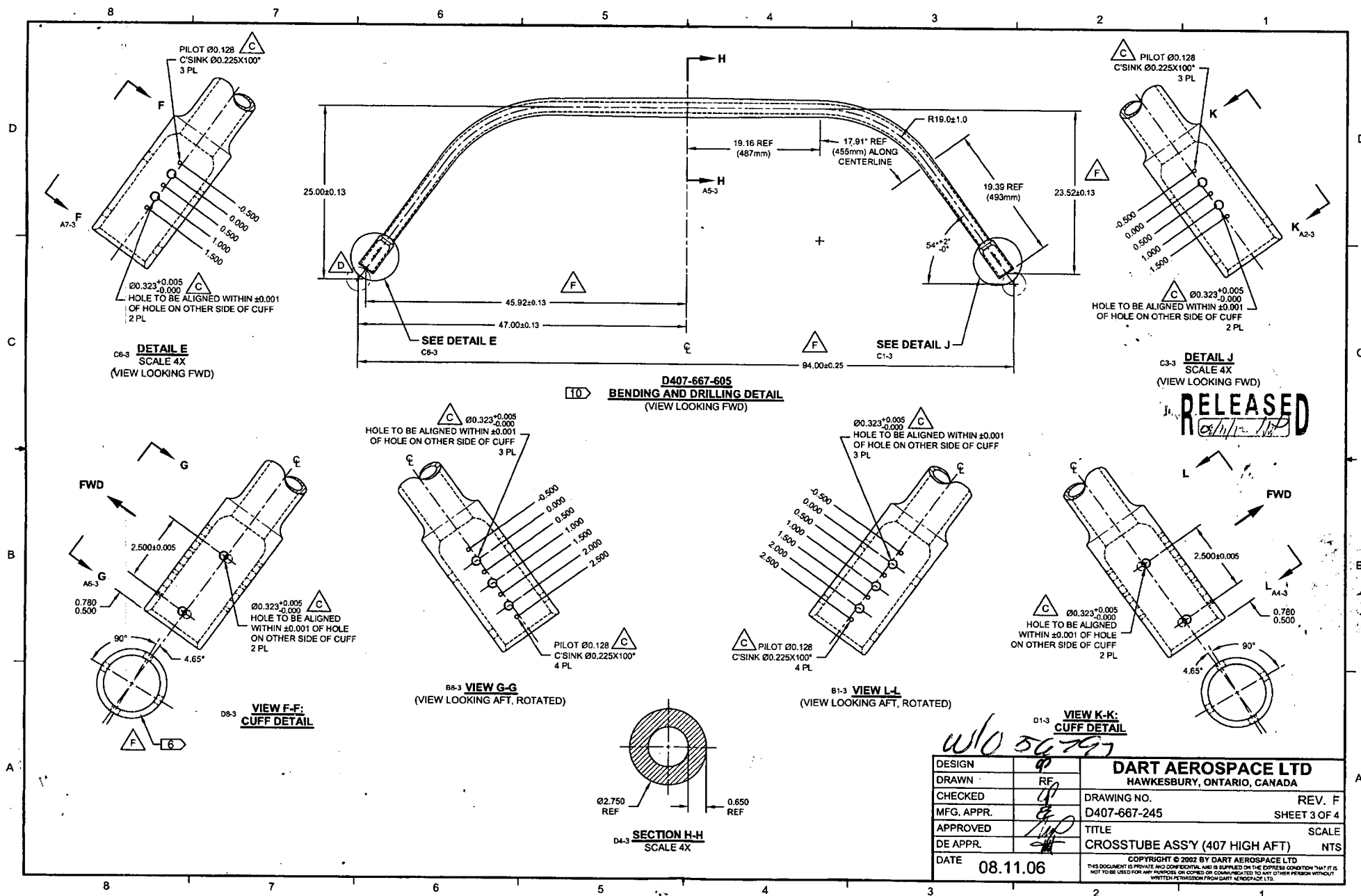
W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



DESIGN	4	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	4	DRAWING NO.	REV. F
MFG. APPR.	4	D407-667-245	SHEET 3 OF 4
APPROVED	4	TITLE	SCALE
DE APPR.	4	CROSSTUBE ASSY (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

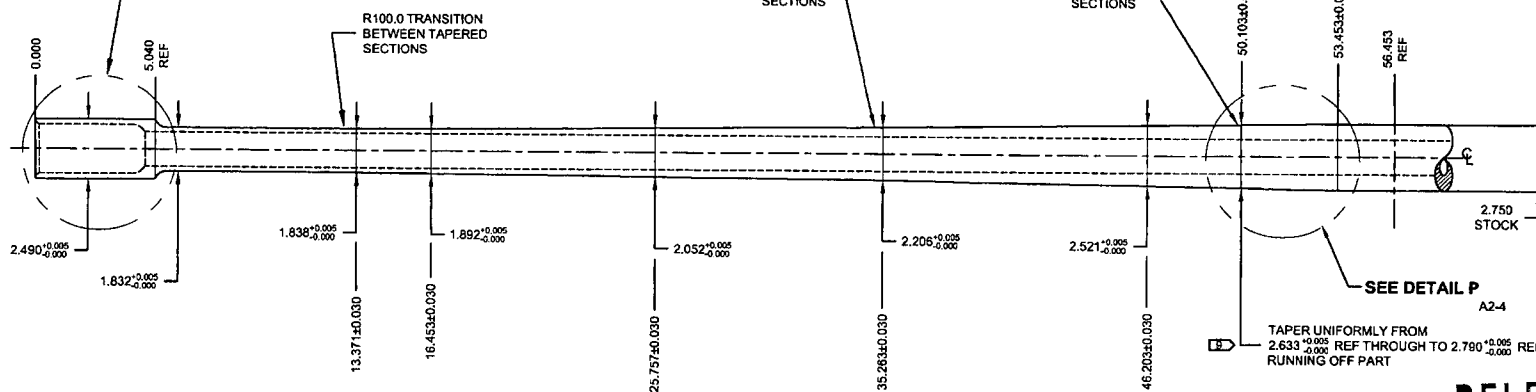
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

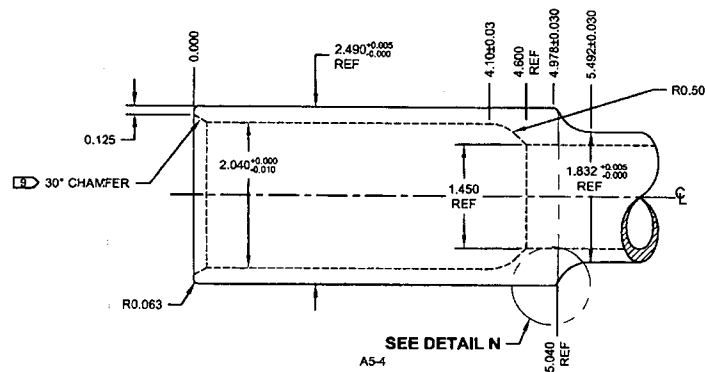
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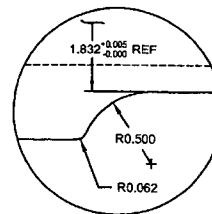
SEE DETAIL M  
A7-4



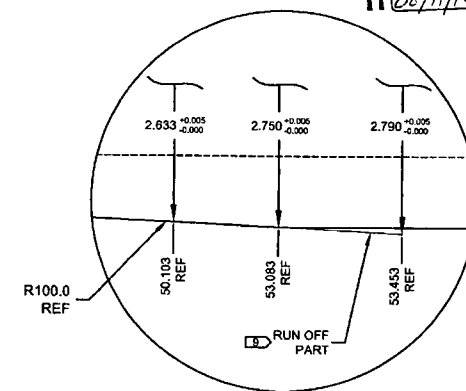
**D407-667-245 MACHINING DETAIL**



**DETAIL M: CROSSTUBE CUFF**  
SCALE 3X



**DETAIL N: CUFF TRANSITION**  
SCALE 2X



**DETAIL P: TAPER RUN-OFF**  
NOT TO SCALE

DESIGN	9	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. F
MFG. APPR.	9	D407-667-245	SHEET 4 OF 4
APPROVED	9	TITLE	SCALE
DE APPR.	9	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
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RELEASED  
08/11/12 JLD

W10 56727

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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## 50 PARTS LIST

Item	Qty -011	Qty -013	Qty -015	Qty -101	Qty -201	Qty -103	Qty -203	Qty -105	Qty -205	Part Number	Description
	X									D206-667-011	SPACER BLOCK KIT
		X								D206-667-013	NUT PLATE KIT (-101/-103/-105/-203/-205)
			X							D206-667-015	NUT PLATE KIT (-201)
				X						D206-667-101	CROSSTUBE INSTALLATION, 206A/B HIGH FWD
					X					D206-667-201	CROSSTUBE INSTALLATION, 206A/B HIGH AFT
						X				D206-667-103	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH FWD
							X			D206-667-203	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH AFT
								X		D407-667-105	CROSSTUBE INSTALLATION, 407 HIGH FWD
									X	D407-667-205	CROSSTUBE INSTALLATION, 407 HIGH AFT
1										D206-667-141	CROSSTUBE ASSEMBLY, 206A/B HIGH FWD
2					1					D206-667-241	CROSSTUBE ASSEMBLY, 206A/B HIGH AFT
3						1				D206-667-143	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH FWD
4							1			D206-667-243	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH AFT
5								1		D407-667-145	CROSSTUBE ASSEMBLY, 407 HIGH FWD
6									1	D407-667-245	CROSSTUBE ASSEMBLY, 407 HIGH AFT
10				*2	*2	*2		*2		D2891-1	SUPPORT
11							*2			D2892-1	SUPPORT
12									*1	D2894-1	SUPPORT
13				*2	*2	*2		*2		D2856-400-694	ABRASION STRIP
14							*2		*2	D2856-400-773	ABRASION STRIP
15									*1	D2856-600-851	ABRASION STRIP
16				4	*4	*4		*4		MS21920-20	CLAMP
17							*4		*4	MS21920-22	CLAMP
18									*2	MS21920-24	CLAMP
19				4	4	4		4		AN5-32A	BOLT
20							4		4	AN5-34A	BOLT
21				4	4	4	4	4	4	MS21042L5	NUT (OR MS21042-5)
22				8	8	8	8	8	8	AN960JD516	WASHER
23									*2	D3190-1	CHAFING SHIELD
30	8									AN4-6A	BOLT
31	9									AN4-7A	BOLT
32	16									AN960JD416	WASHER
33	2									D3193-041	SPACER BLOCK ASSEMBLY
40		2		*2		*2	*2	*2	*2	D2873-043	NUT PLATE
41		2		*2		*2	*2	*2	*2	D2873-045	NUT PLATE
42			2		2					D2872-043	NUT PLATE
43			2		2					D2872-045	NUT PLATE
44				10		10				AN5-7A	BOLT
45		10	10		10		10	10	<10	AN5-10A	BOLT
46		4	4	4	10	4		4		AN5-30A	BOLT
47		4					4		4	AN5-32A	BOLT
48			8	10	12	10	10	10	10	AN960JD516	WASHER
49			4		6					MS21042L5	NUT (OR MS21042-5)

REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-141/241/143/243, &amp; D407-667-145/245 ASSEMBLIES ABOVE

W/O:			WORK ORDER CHANGES					
DATE	STEP		PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



## LIQUID PENETRANT TEST REPORT

P- 05485

CLIENT

ATTENTION

ADDRESS

PROJECT

ITEM(S) EXAMINED

DATE

ACUREN JOB NO.

PO/WORK NO.

WORK LOCATION

ACCEPTANCE STD.

PAGE

OF

TIME AM ☒ PM ☐

188-10-0676

[112-14]

AS A ADDRESS

ASTM 1417/431-038 REV./DATE 2005

DART AEROSPACE  
LINDA HAZLE CHARTER / PA  
1270, ABERDEEN ST.  
HAWKESBURY, ON

FPI ON 6 X "CROSS TUBES"

SEE W.O. # BELOW

JOB DESCRIPTION

PROCEDURE NO. LT-002 REV./DATE 2008

TECHNIQUE NO. LT-002

REV./DATE 2008

PART NO.

MATERIAL ALUMINUM THICKNESS

SCOPE

PERFORMED A WET-FLUORESCENT LIQUID PENETRANT INSPECTION ON 100% OF THE EXTERNAL SURFACE

## TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGNA FLUX		BLACK LIGHT S/N 13798	OUTPUT > 1000 $\mu$ W/cm <sup>2</sup>	AMBIENT < 2 fc
PENETRANT	ZL-67	MINIMUM DWELL TIME 10 MIN.	LIGHTING EQUIP. <input checked="" type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT	OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER	WATER	MINIMUM DRY TIME > 10 MIN.	OTHER		
DEVELOPER	SKD-S2	MINIMUM DWELL TIME 10 MIN.	LIGHT METER S/N		CAL DUE DATE MAY/10/2008
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		

## TEST SURFACE

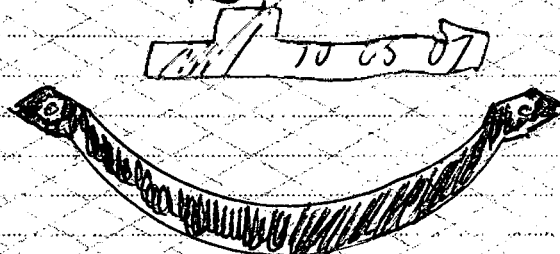
SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F	<input checked="" type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F	<input type="checkbox"/> > 52°C/ 125°F	

## RESULTS-

☐ METRIC ☒ IMPERIAL

ITEM	DESCRIPTION	RESULT
1	WET FLO L.P.I. ON 100% EX. SURF.	
1	CROSS TUBE - W.O. ID 57235	✓
2	CROSS TUBE - W.O. ID 57236	✓
3	CROSS TUBE - W.O. ID 58187	✓
4	CROSS TUBE - W.O. ID 58188	✓
5	CROSS TUBE - W.O. ID 56797	✓
6	CROSS TUBE - W.O. ID 56798	✓

"CROSS TUBE"



ITEM ID: - D212-664-201 (ITEM #1-2)  
- D212-664-203 (ITEM #3-4)  
- D407-667-205 (ITEM #5-6)

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE

TECHNICIAN (SIGNATURE):

NAME (PRINT):

Zam T. Hery

YVES DESLUSERS

CGSB LEVEL 2 SNT LEVEL 2  
CGSB REG. NO. 3049

[Signature]

CGSB LEVEL 2 SNT LEVEL 2  
CGSB REG. NO. [blank]

DTR # E48632

REPORT

REVIEWED BY:

NAME

INITIALS